

# REVIEW ON OCCUPATIONAL HEALTH DISEASES IN THE TEXTILE INDUSTRIES

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**Abstract** - This review article outlines the possible occupational diseases which replicate the historical data in the textile industries and its associated processes. The textile sector contributes a lot to the countries growth and it is considered to be one of the most important industrial sectors throughout the globe in spite of various steps taken to reduce occupational health hazards, there is huge gap to reduce the risk further to the ALARP (As Low As Reasonably Practicable) level. This suits, particularly for occupational disease issues. Sustained attention on the exposure to the cotton clouds of dust and other fibres hope to retain progressive healthy culture.

**Keywords:** ALARP, Byssinosis, Diffuse Lung Disease, Toxic Liver Disease, Chronic Bronchitis, Respiratory Disorders.

## 1. INTRODUCTION

The textile industry has plenty of departments such as weaving, spinning, dyeing and printing and furthermore, processes that are essential to manufacturing finished garment or fabric. In the textile industry, health and safety is a vital problem of the operating personals. It is a kind of industry in which the profession affects the health of the workers. These professions have plenty of associated hazards and risk. These hazards not only affect the physical health of the workers but also affect them mentally and psychologically. Disease arose from the textile industries are characterized by a serious decline in the respiratory function, this study records it histologically. The Professionals in the textile industry are exposed to various hazards such as physical hazards, chemical hazards and biological hazards, psychosocial hazards such as mental stress and psychological imbalance [1]. In a study, it is stated that the lung-related disease stands first in the row of occupational hazards in the textile industry, followed by the reproduction system disorder, noise-induced hearing loss, heart-related and vision-related diseases, Neurotoxicity and other dermatological conditions and mental stress [2]. In Europe, the textile sectors hold about 2.5 million subjects and women are considerably high in percentage than men. It is also recorded that women are affected by respiratory diseases [3]. The inhalation of the organic fibres poses an equal amount of threat to human lives as that of the inorganic fibres. The workers should be careful and consider their safety while being exposed to organic fibres such as the cotton fibre [4]. Though, we believe that there is a huge

decline in the occupational diseases for which the companies are focusing on safety. The recent studies show that there is a significant rise in incidence across the developing society [5]. The increase in the usage of machinery to pick cotton from the fields reports that these kinds of cotton take up more amount of dust and debris to the textile industry than that of the hand-picked cotton [6]. Though there are many factors which are found to pose a life threat to the professionals such as poor working conditions adopted in the native country, climatic factors, etc., the sanitary measures inside the factory premises can reduce the further harm to the professionals [7]. The common risk factors identified as the lack of awareness among the workers on their occupational hazards and the prolonged exposure due to unusual work timings [8]. The workers involved in the dyeing process are found to be conquered by these respiratory disorders [9]. The smokers were found to be significantly more affected by the declines in respiratory function [10]. It is highly recommended by the experts that the usage of personal protective equipment's accompanied by implantation of proper engineering controls in the production technologies could account a genuine contribution to reducing the occupational diseases further [11]. It is also found that liver diseases are highly associated with the occupation in the dyeing process [13].

## 2. EVIDENCES OF POSSIBLE RESPIRATORY DISORDERS DUE TO COTTON DUST EXPOSURE.

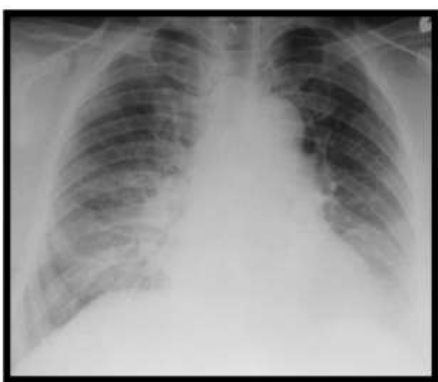
The workers are highly exposed to specks of dust from various materials like wool, cotton, hemp, flax, sisal and few other materials which can occur during various processes that are carried out in the textile industries [3]. At the time of inhalation, these dust particles travel through our respiratory tract and enter our lung, alveoli are the last part in the respiratory system it filters the dust completely and transfers the inhaled oxygen to the bloodstream. The trapped dust particles remain to settle in the alveoli and prevent the further diffusion of oxygen to the blood cells. This issue leads to various respiratory disorders among workers. The possible disorders are listed below concerning the previous studies

### 2.1. BYSSINOSIS

The exposure to the cotton dust for a high period may lead to a deadly disease called as byssinosis usually known as the brown lung. This disease is indicated by difficulties in

breathing, chest tightening, wheezing. It has been reported by OSHA (Occupational Safety and Health Administration) in the year 1938 in united states of America, that more than 30000 people are affected by byssinosis and nearly 100000 people are in the stage of high risk to get affected by this disease[1].Due to the evaluation of types of machinery the nature of work in the textile sector has become quite comfortable for the women and they show a majority of workers in the textile sector. By the division of the work based on gender lines, the women are subjected to be highly exposed to organic fibres than men do[3].A study conducted in Beninese Company of Textiles to assess the disorders in the respiratory system of the professionals involved in the production sector, it reveals that the study involved 656 characters regularly exposed to cotton dust and 113 characters not exposed to cotton dust. The analysis revealed that nearly 44% of characters from both exposed and non-exposed characters have byssinosis symptoms. The exposure of cotton dust was not only observed within the processing zone but also has an adverse effect on the processing sector [5].

On the examination of the men in the blow room and card room, it was observed that those people fall under the age group of 50-60 are the most affected by byssinosis. A total number of 190 participants were subjected to assess the respiratory functions. 115 subjects (60.52%) of the 190 were found to be affected by byssinosis. Byssinosis is actually far more different from actual bronchitis, initially, it has a dry cough and the same develops to a severe stage and sometimes leads to lifetime disabilities [6]. The fig.1. Represents the chest radiographic view of female adult of age 56, she has been working in the textile industry for a period of 7 years. The traces of the cotton dust show the degradation of the lung [11].



**Fig.1.** lung affected by Byssinosis [11].

## 2.2. DIFFUSE LUNG DISEASE

This type of disease is characterized by the degradation of the interstitial connective tissues which is present between the lung portion and the alveoli. These connective tissues give stability for the alveoli to maintain a proper fit during the inhalation of the air. A case report from a study reveals that a subject of age 66 had exposed to cotton dust for a

period of nearly 50 years and interestingly he had possessed no symptoms of byssinosis but after a severe examination organic cellulose fibres were found in the subject's lungs and it is stated that the situation can be called as the cotton dust pneumoconiosis[4].

## 2.3. DRY COUGH

Persons working in the cotton dust exposure zone experienced the effect of chronic cough. Chronic cough is signified as the prolonged coughing for a period of 3 months. It is defined as the dry cough only from the throat and not from deep down. It causes irritation in the throat due to the inhalation of allergic cotton dust. The chronic cough differs from usual asthma but it is the progression towards asthma. It was clearly proven in a study conducted by Ahasan, Ahmed and Khan to assess the occupational exposure among the textile sector workers that almost 16.8 % of the total subjects in the exposed workers were found the symptoms of chronic dry cough, and about 2.9 % of the total subjects in the non-exposed workers were found the symptoms of the same [7]. A study conducted by A A Nafees functioning of lung among the textile workers in Karachi and Pakistan involving about 372 adult males from 15 different textile mills, the results shows that nearly 7.5 % of the total subjects were suffered from a chronic cough. This study states the chronic cough as a state in which the subject experiences cough for consecutive 90 days a year, for at least 24 months[8].

## 2.4 DISCOMFORT IN BREATHING AND CHEST CONSTRICTION.

It was found that there is a significant difference between the breathing ability in cotton dust exposed and non-exposed workers and it was found that most of the subjects felt uncomfortable in breathing [9].similarly in a study conducted by AV Hinson involved 656 exposed characters and 113 characters non exposed to cotton dust, pointed out that 7.2% of the total experienced chest constriction and 9.9 % of the total experienced breathing difficulties and the study also stated that there was some good amount of gap observed in the results between the exposed and non-exposed workers[1]. It is recorded that in a study conducted by C.H.Laraqui the shortness of breath found common among the 16.5% of the total 224 exposed and 80 non exposed individuals [10].

## 2.5 CHRONIC BRONCHITIS.

A study by AV Hinson defines chronic bronchitis as the regular cough accompanied by the mucus fluid from the respiratory tract for a period not less than three months. It seemed in their observe recorded 3.5% in the exposed while at 0.9% in the non-exposed people [1] similarly Glindmeyers study reports on an average exposure of 196 µg/m<sup>3</sup> across shift change in the Yarn manufacturing workers suffered 9.4% on total of 827 falling above 40 years of age [12].

### 3. TOXICLIVER DISEASE.

The dimethylformamide is usually a solvent which is defined to have excellent properties and hence It is mainly used in the aramid fibres which contributed a major per cent of the military fabrics. The studies show that the N, N-dimethyl amides which are commonly known to be Hallcomids are characterised by toxicity in several animal species such as mice, cat, rabbit and rats. It is clarified that the dimethylformamide is accountable for the toxic liver diseases and could be a carcinogenic chemical which may lead to cancer in living beings and it also affects the reproducing system in women and leads to birth defects [13, 14].

### 4. NOISE INDUCED HEARING LOSS (NIHL)

Any undesirable signal is termed to be the noise. Theoretically, there are three classifications of noise such as continuous noise, impact noise and intermittent noise. The regulations in Tamilnadu shows that 90 dBA for the continuous noise for 8-hour exposure, 140 dB for the impact noise not exceeding 100 impacts a day. The ear consists of three major portions as shown in figure.3.1. The external portion contains Pinna and ear canal, the middle portion contains three bones namely hammer, anvil, stirrup and the innermost portion called cochlea consisting of numerous tiny oscillating hair cells. The cochlea transmits the signal to the brain in correspondence with the sound received. It is evident that when a person is exposed to high noise continuously the hair cells in the cochlea begins to stop responding to the sound frequency further. The stationary cochlea sends no signal to the brain upon received sound signal. This is known to the irreparable disease commonly known to be Noise-induced hearing loss. A study reveals that there is high noise level in the textile processing sections that it could lead to the lifetime hearing loss which could be accompanied by tinnitus in the early stages characterised by a temporary ringing sound in the ears. Noise in various sections of the textile industry ranges from 40 dBA to 100 dBA. table 1 describes the noise levels recorded in various sections in a textile company in Lagos Metropolis. This study involved 204 subjects including the non-exposed areas such as administration block. The audiometric test results of these subjects clearly indicate that there is a significant amount of threshold shift is observed among the workers [15,16,17].

Table.1. Noise levels of various sections in the textile industry [15].

DEPARTMENT	NOISE LEVEL (dBA)	
	Range	Average
Weaving	94-100	97
Spinning	94-96	95
Blowing	85-89	87
Carding	85-87	86
Engineering and maintenance	85-89	87
Cone- winding	85-91	90
Washing and bleaching	83-85	84
Dyeing and Printing	80-85	83
Packing and storage	64-75	68
Administration	40-60	56

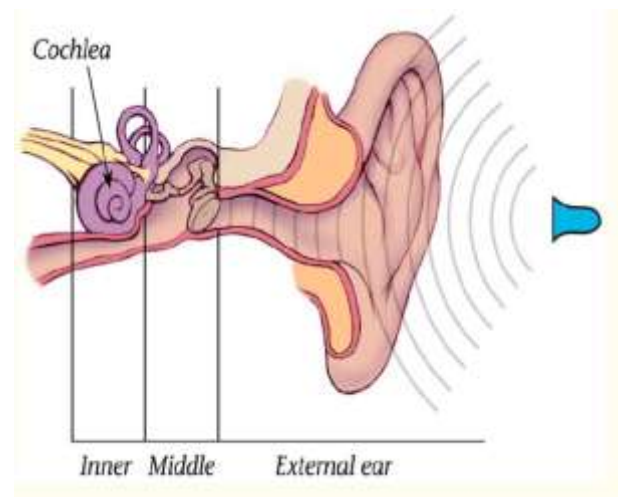


Figure.3.1. Anatomy of the ear [18].

### 5. DISCUSSION

All the subjects in this study are explored in detail and they presented at least one symptom which is considered symptomatic in this study. It is revealed that among all the diseases byssinosis is considered to be the most vulnerable to human health. Women are most affected by these diseases than men. The worst part observed that no proper preventive measures are taken by the management such as lack of awareness programs and lack of the required facilities, it has its main source from poor funding from the management. In most cases, professionals are not told about their occupational hazards and that may stand as a major reason for their exposure to hazardous particles, it is believed that the awareness on health conditions could have possibly reduced the occurrence of these diseases. Some cases from the early 19th-century report that the doctors weren't able to diagnose the byssinosis the reason is stated as they were not able to differentiate bronchitis and byssinosis. This paper reminds the management on the severity of the occupational diseases in the textile sector. On the whole, the impact of these diseases are not only observed

among the exposed subjects but also among the non exposed individuals, this reveals the polluted environment surrounding the textile sectors.

## 6. CONCLUSION

This study permitted us to estimate the histological superiority of respiratory disorders such as Byssinosis, chronic cough, discomfort in breathing, diffuse lung disease, chronic bronchitis, toxic liver diseases and noise-induced hearing loss. Throughout the study, it is evident that the superiority of these diseases found significantly higher than those of the non-exposed individuals. The superiority of these diseases varies in the sector according to typical climatic conditions, the nature of the working environment, gender, age. This study has not been able to encompass the environmental parameters in the textile sector such as the humidity level, the quantity of the dust present, temperature. This review leads to reconsideration in the usage of effective personal protective equipment and also the implementation of sound technical and administrative controls against the sources of these diseases

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